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| 09/352,362 | 07/13/1999 | SHUNPEI YAMAZAKI | 0756-1996 | 2149 |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/352,362 | YAMAZAKI ET AL. | |
| | Examiner | Art Unit | |
| | José R Díaz | 2815 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *15-24,28,30-115 and 123-171* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-24,28,30-115 and 123-171* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Information Disclosure Statement*

➢ As stated in the Advisory Action mailed on January 4, 2002 (Paper No. 19), the information disclosure statement filed on December 18, 2001 (Paper No. 16) fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the IDS does not comply with the provisions of 37 CFR 1.97(d). It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1). Therefore, applicant is advised to re-submit the IDS in order to be considered by the examiner.

### *Claim Rejections - 35 USC § 102*

➢ The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent

granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

➢ Claims 15-24, 30, 32-34, 36, 38-40, 42-44, 46-52, 60-80, 88-115, 130-136, 144-164 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki et al. (JP 10-1035,469).

Regarding claims 15-16, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1st heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0041]); irradiating a laser light (laser annealing) to said crystalline semiconductor thin film (see paragraph [0045]); carrying out a second heat treatment (heat treatment in nitrogen atmosphere) at 900-1200 °C after the irradiation step (see paragraph [0064]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said second heat treatment (see paragraphs [0109]-[0122]).

Regarding claims 17-19, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1st heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0041]); irradiating a laser light to said crystalline semiconductor thin film (see paragraph

[0045]); carrying out a second heat treatment in a reducing atmosphere including halogen element after the irradiation step (see paragraphs [0084] and [0211]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said second heat treatment (see paragraphs [0109]-[0122]).

Regarding claims 20-21, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1st heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0041])); carrying out a second heat treatment of irradiating a laser light to said crystalline semiconductor thin film (see paragraph [0045]); carrying out a third heat treatment at 900-1200 °C in a reducing atmosphere after the second heat treatment (see paragraph [0064]).

Regarding claims 22-24, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1st heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0041]); carrying out a second heat treatment of irradiating a laser light to said crystalline semiconductor thin film (see paragraph [0045]); carrying out a third heat

treatment at 900-1200 °C in a reducing atmosphere including a halogen element after the second heat treatment (see paragraph [0064]).

Regarding claim 30, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) (see Fig. 1B); crystallizing said semiconductor film (see Fig. 1C and paragraph [0041])); irradiating a laser light to said crystalline semiconductor film (see paragraph [0045]); subsequently heating the crystallized semiconductor film provided with an oxide formed over a surface thereof in an atmosphere which reduces said oxide formed over said surface (see paragraphs [0049], [0052] and [0064]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said heating (see paragraphs [0109]-[0122]).

Regarding claims 32 and 33, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) comprising silicon over a substrate (101) (see Fig. 1B); irradiating a laser light to said crystalline semiconductor film (see paragraph [0045]); etching a surface (e.g. to form active regions) of the crystallized semiconductor film after the irradiation step to remove an oxide (see paragraphs [0085] and [0213]), heating the crystallized semiconductor film in a reducing atmosphere (nitrogen) after said etching step to form a flattened surface of the crystallized semiconductor film (see paragraphs [0213]-[0214]).

Regarding claim 34, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) comprising silicon over a substrate (101) (see Fig. 1B); crystallizing said semiconductor film (see Fig. 1C and paragraph

[0041]); irradiating a laser light to said crystalline semiconductor film (see paragraph [0045]); subsequently heating the crystallized semiconductor film provided with an oxide formed over a surface thereof at a temperature of 900-1200 °C in an atmosphere which reduces said oxide formed over said surface (see paragraph [0049], [0052], and [0064]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said heating (see paragraphs [0109]-[0122]).

Regarding claims 36 and 38-40, Yamazaki et al. teach that said heating step is carried out by furnace annealing (see paragraph [0041] and [0064]).

Regarding claims 42-44, Yamazaki et al. teach that said heating step is carried out while exposing said semiconductor film (see paragraph [0041] and [0064]).

Regarding claims 46-49, 60-63, 67-70, and 74-77, Yamazaki et al. teach that the crystallizing step is performed by a heat treatment in an atmosphere containing oxygen, hydrogen, laser light and/or in an inactive atmosphere (see paragraph [0038], [0041] and [0045]).

Regarding claims 50-52, 64-66, 71-73, and 78-80, Yamazaki et al. teach that the crystallizing step is carried out by irradiating an infrared light and/or ultraviolet light (see paragraph [0038] and [0045]).

Regarding claims 88-115, 130-136, and 144-164, Yamazaki et al. teach that the semiconductor device is a video camera, a digital camera, a projector, a

head mount display, a car navigation system, a personal computer, a portable information terminal (see figure 16).

➢ Claims 15-24, 30, 32-34, 36, 38-40, 42-44, 46-52, 60-80, 88-115, 130-136, 144-164 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamazaki et al. (US 2002/0100937 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 15-16, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1$^{st}$ heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0059]); irradiating a laser light (laser annealing) to said crystalline semiconductor thin film (see paragraph [0063]); carrying out a second heat treatment (heat treatment in nitrogen atmosphere) at 900-1200 °C after the irradiation step (see paragraph [0084]), wherein asperities of a surface of said crystalline semiconductor thin film

are formed by said laser light, and said asperities are flattened by said second heat treatment (see paragraphs [0134]-[0147]).

Regarding claims 17-19, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1st heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0059]); irradiating a laser light to said crystalline semiconductor thin film (see paragraph [0063]); carrying out a second heat treatment in a reducing atmosphere including halogen element after the irradiation step (see paragraphs [0067] and [0084]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said second heat treatment (see paragraphs [0134]-[0147]).

Regarding claims 20-21, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1st heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0059])); carrying out a second heat treatment of irradiating a laser light to said crystalline semiconductor thin film (see paragraph [0063]); carrying out a third heat treatment at 900-1200 °C in a reducing atmosphere after the second heat treatment (see paragraph [0084]).

Regarding claims 22-24, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1st heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0059]); carrying out a second heat treatment of irradiating a laser light to said crystalline semiconductor thin film (see paragraph [0063]); carrying out a third heat treatment at 900-1200 °C in a reducing atmosphere including a halogen element after the second heat treatment (see paragraphs [0067] and [0084]).

Regarding claim 30, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) (see Fig. 1B); crystallizing said semiconductor film (see Fig. 1C and paragraph [0059])); irradiating a laser light to said crystalline semiconductor film (see paragraph [0063]); subsequently heating the crystallized semiconductor film provided with an oxide formed over a surface thereof in an atmosphere which reduces said oxide formed over said surface (see paragraphs [0067], [0070] and [0084]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said heating (see paragraphs [0134]-[0147]).

Regarding claims 32 and 33, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) comprising silicon over a substrate (101) (see Fig. 1B); irradiating a laser light to said crystalline semiconductor film (see paragraph [0063]); etching a surface (e.g. to form active regions) of the

crystallized semiconductor film after the irradiation step to remove an oxide (see paragraphs [0064] and [0213]), heating the crystallized semiconductor film in a reducing atmosphere (nitrogen) after said etching step to form a flattened surface of the crystallized semiconductor film (see paragraphs [0213]-[0214]).

Regarding claim 34, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) comprising silicon over a substrate (101) (see Fig. 1B); crystallizing said semiconductor film (see Fig. 1C and paragraph [0059]); irradiating a laser light to said crystalline semiconductor film (see paragraph [0063]); subsequently heating the crystallized semiconductor film provided with an oxide formed over a surface thereof at a temperature of 900-1200 °C in an atmosphere which reduces said oxide formed over said surface (see paragraph [0067], [0070], and [0084]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said heating (see paragraphs [0134]-[0147]).

Regarding claims 36 and 38-40, Yamazaki et al. teach that said heating step is carried out by furnace annealing (see paragraph [0059] and [0084]).

Regarding claims 42-44, Yamazaki et al. teach that said heating step is carried out while exposing said semiconductor film (see paragraph [0059] and [0084]).

Regarding claims 46-49, 60-63, 67-70, and 74-77, Yamazaki et al. teach that the crystallizing step is performed by a heat treatment in an atmosphere

containing oxygen, hydrogen, laser light and/or in an inactive atmosphere (see paragraphs [0056], [0059] and [0063]).

Regarding claims 50-52, 64-66, 71-73, and 78-80, Yamazaki et al. teach that the crystallizing step is carried out by irradiating an infrared light and/or ultraviolet light (see paragraph [0056] and [0063]).

Regarding claims 88-115, 130-136, and 144-164, Yamazaki et al. teach that the semiconductor device is a video camera, a digital camera, a projector, a head mount display, a car navigation system, a personal computer, a portable information terminal (see figure 16).

### *Claim Rejections - 35 USC § 103*

➢ The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

➢ Claims 28, 31, 35, 37, 41, 45 53-59, 81-87, 123-129, 137-143 and 165-171 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki (JP 10-1035,469) in view of Zhang et al. (US Pat. No. 5,403,772), previously cited in paper No. 9.

Regarding claim 28, Yamazaki et al. teach a method comprising the steps of: adding an element (106) for facilitating crystallization of an amorphous semiconductor thin film (103) (see Fig. 1B); carrying out a first heat treatment (1$^{st}$ heat treatment) to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film (see Fig. 1C and paragraph [0041]); irradiating a laser light to said crystalline semiconductor thin film ((see paragraph [0045]); carrying out a second heat treatment at 900-1200 °C in a nitrogen reducing atmosphere after the irradiation step (see paragraph [0064]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said second heat treatment (see paragraphs [0109]-[0122]). However, Yamazaki et al. does not teach the use of a reducing atmosphere comprising a hydrogen gas. Zhang et al. teaches that is well known in the art to use hydrogen or nitrogen as a reducing atmosphere (see col. 4, lines 41-42). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Yamazaki et al. to substitute the nitrogen-reducing atmosphere by a hydrogen-reducing atmosphere.The ordinary artisan

would have been motivated to modify Yamazaki et al. in the manner described above for at least the purpose of improving the quality of the film.

Regarding claim 31, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) (see Fig. 1A); crystallizing said semiconductor film (see Fig. 1C and paragraph [0041])); irradiating a laser light to said crystalline semiconductor film (see paragraph [0045]); subsequently heating the crystallized semiconductor film provided with an oxide formed over a surface thereof in an atmosphere which reduces said oxide formed over said surface (see paragraphs [0049], [0052] and [0064]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said heating (see paragraphs [0109]-[0122]). However, Yamazaki et al. does not teach the use of a reducing atmosphere comprising a hydrogen gas. Zhang et al. teaches that is well known in the art to use hydrogen or nitrogen as a reducing atmosphere (see col. 4, lines 41-42). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Yamazaki et al. to substitute the nitrogen-reducing atmosphere by a hydrogen-reducing atmosphere.The ordinary artisan would have been motivated to modify Yamazaki et al. in the manner described above for at least the purpose of improving the quality of the film.

Regarding claim 35, Yamazaki et al. teach a method comprising the steps of: forming semiconductor film (103) comprising silicon over a substrate (101) (see Fig. 1B); crystallizing said semiconductor film (see Fig. 1C and paragraph [0041]); irradiating a laser light to said crystalline semiconductor film (see paragraph [0045]); subsequently

heating the crystallized semiconductor film provided with an oxide formed over a surface thereof at a temperature of 900-1200 °C in an atmosphere which reduces said oxide formed over said surface (see paragraph [0049], [0052], and [0064]), wherein asperities of a surface of said crystalline semiconductor thin film are formed by said laser light, and said asperities are flattened by said heating (see paragraphs [0109]-[0122]). However, Yamazaki et al. does not teach the use of a reducing atmosphere comprising a hydrogen gas. Zhang et al. teaches that is well known in the art to use hydrogen or nitrogen as a reducing atmosphere (see col. 4, lines 41-42). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Yamazaki et al. to substitute the nitrogen-reducing atmosphere by a hydrogen-reducing atmosphere. The ordinary artisan would have been motivated to modify Yamazaki et al. in the manner described above for at least the purpose of improving the quality of the film.

Regarding claims 37 and 41, Yamazaki et al. teach that said heating step is carried out by furnace annealing (see paragraph [0041] and [0064]).

Regarding claims 45, Yamazaki et al. teach that said heating step is carried out while exposing said semiconductor film (see paragraph [0041] and [0064]).

Regarding claims 53-56 and 81-84, Yamazaki et al. teach that the crystallizing step is performed by a heat treatment in an atmosphere containing oxygen, hydrogen, laser light and/or in an inactive atmosphere (see paragraph [0038], [0041] and [0045]).

Regarding claims 57-59, and 85-87, Yamazaki et al. teach that the crystallizing step is carried out by irradiating an infrared light and/or ultraviolet light (see paragraph [0038] and [0045]).

Regarding claims 123-129, 137-143 and 165-171, Yamazaki et al. teach that the semiconductor device is a video camera, a digital camera, a projector, a head mount display, a car navigation system, a personal computer, a portable information terminal (see figure 16).

***Double Patenting***

➢ The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

➢ Claims 15-24, 28, 30-115 and 123-171 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of copending Application No. 09/894,125. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method discloses by the copending Application essentially discloses all claimed feature.

For example, the copending Application recites the limitations, as required by the present Application, of: crystallizing an amorphous layer, irradiating the semiconductor film, etching the film after the step of irradiating; and performing a further heat treatment in a reducing atmosphere.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

➢ Claim 15-16, 20-21, 28, 30-115 and 123-171 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-77 of copending Application No. 10/081,767in view of Yamazaki et al. (US Pat. No. 5,907,770).

Claims 15-16, 20-21, 28, 30-31, 34-35, 42-48, 53-55, 60-62, 67-69, 74-76, and 81-83 of the present Application recites the steps of: adding an element for facilitating crystallization of an amorphous layer (which is recited in claims 6-8 of the copending Application); performing a first heat treatment (which is recited in claims 6-8 of the copending Application); irradiating a laser light (which is recited in claims 6-8, 9, 27, 38, 49, 54 and 66 of the copending Application); and carrying out a second heat treatment at 900 °C to 1200 °C in a reducing atmosphere (which is recited in claims 6-8 of the copending Application). Please note that although claims 6-8 of the copending Application does not recite the claimed temperature range, it is obvious from claims 4-5 of the copending Application that such second heat treatment is performed at such high temperatures. Therefore, it would have been obvious to one having ordinary skill in the

art at the same time the invention was made to modify the invention recited in claims 6-8 of the copending Application to include a temperature range of 900 °C to 1200 °C. The ordinary artisan would have been motivated to modify the copending Application in the manner described above for at least the purpose of flattening the substrate and reducing the warp of the substrate.

With regards to the reducing atmosphere, claims 6-8 of the copending Application do not recite such a limitation. However, Yamazaki et al. (US Pat. No. 5,907,770) discloses that nitrogen and hydrogen are well-known reducing atmospheres used in the art (see col. 13, lines 63-65; col. 14, lines 4-6; col. 17, lines 51-54; and col. 24, lines 54-56). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify the copending Application to include nitrogen and hydrogen reducing atmospheres. The ordinary artisan would have been motivated to modify the copending Application in the manner described above for at least the purpose of flattening the substrate and reducing the warp of the substrate.

Claims 32 and 33 of the present Application recite the further step of etching the crystallized semiconductor film after the step of irradiating the film. This additional limitation can be found in claim 8 of the copending Application.

Claims 36-41 of the present Application recite the further limitation that said heating step is carried out by furnace annealing. This additional limitation can be found in claims 11, 17, 29, 40, 56, and 68 of the copending Application.

Claims 49-52, 56-59, 63-66, 70-73, 77-80, 84-87 of the present Application recite the further limitation that the crystallizing step is carried out by irradiating an infrared

light and/or ultraviolet light. This additional limitation can be found in claims 9-12, 15, 17-18, 21, 27-30, 32-33, 38-41, 44, 49-50, 54-57, 60, and 66-69 of the copending Application.

Claims 88-115 and 123-171 of the present Application recite the further limitation that the semiconductor device is a video camera, a digital camera, a projector, a head mount display, a car navigation system, a personal computer, and a portable information terminal. This additional limitation can be found in claims 26, 37, 48, 53, 65, and 77 of the copending Application.

This is a provisional obviousness-type double patenting rejection.

### *Response to Arguments*

➢ Applicant's arguments, see page 2, fifth paragraph of *Remarks*, filed June 4, 2003, with respect to the rejection(s)of claim(s) 15-24, 28, 30-115, and 123-171 under 35 U.S.C. §102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yamazaki et al. and Zhang et al. Please see rejections above.

### *Conclusion*

➢ The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamazaki et al. (JP 10-125927) disclosed the same invention recited in Yamazaki et al. (JP 10-1035,469), which is the primary reference in the

rejections presented in this Office action (see entire disclosure); and Yamazaki et al. (US 2003/0094625 A1) discloses the use of an atmosphere comprising hydrogen after the step of irradiating the amorphous layer (see paragraphs [0792]-[0805]).

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 9:00-5:00 Monday, Tuesday, Thursday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 746-3891 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
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JRD
June 25, 2003